

SECTION 9.0

Alternatives

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A range of reasonable alternatives to the proposed Central Valley Energy Center (CVEC) are identified and evaluated in this section including the “No Project” alternative (that is, not developing a new power generation facility), alternative site locations for constructing and operating CVEC, alternatives to the linear facilities (electric, natural gas, and water), alternative combined cycle configurations to the combustion turbine and steam turbine arrangement currently proposed for CVEC, and alternative power generation technologies. This section also describes the site selection criteria used in determining the proposed location of CVEC. Electric transmission connection alternatives are addressed in Section 5.0 and alternative natural gas supply routes are addressed in Section 6.0; alternative reclaimed water supply routes are addressed in Section 7.0.

9.1 No Project Alternative

9.1.1 Description

If the “No Project” alternative is selected, CVEC would not receive authorization to construct and operate a new power generation facility. As a result, the proposed facility site would not be developed and would be used for some industrial development, consistent with the zoning. Energy that would have been produced by the proposed facility would need to be generated by another available source; common available sources include older power generation facilities that operate inefficiently and release larger quantities of air pollutants.

The purpose of a merchant power plant, such as CVEC, is to generate and sell electric power to deregulated markets. To meet this objective, generating facilities need to be operated in a cost-effective manner and produce power at a cost that is acceptable to end users. With CVEC, the Applicant will incur financial risks of project success or failure.

The “No Project” alternative is not considered feasible because it does not meet the objectives of a deregulated energy market, nor does it meet the Applicant’s business plans for the development of new merchant power generation facilities, or the general objective of replacing existing, less efficient generation facilities.

9.1.2 Potential Environmental Impacts

CVEC will produce electricity for the deregulated market while consuming less fuel and discharging fewer air emissions for each energy unit generated when compared to other existing, older fossil fuel generation facilities. This is a beneficial environmental impact.

Potential environmental impacts from the “No Project” alternative would result in greater fuel consumption and air pollution because new merchant power plants, including CVEC, would not be brought into operation to displace production from older, less efficient, higher air emissions power plants.

9.2 Proposed and Alternative Sites

The California Independent System Operator (CAISO) has identified the southern San Joaquin Valley as needing additional generation capacity as a result of increasing demand for electricity in that rapidly urbanizing area. Location of a plant as close as possible to suitable transmission facilities reduces the loss of power incurred in transmission as well as the cost of transmission.

The location of the proposed CVEC provides access to the electrical markets throughout the Pacific Gas and Electric (PG&E) transmission system. Dispersing the plant locations throughout the area also helps place the electricity source close to the users and promotes stability of the electricity grid by not having all generation emanating from a single point on the grid.

9.2.1 Project Objectives

The proposed project was developed with the objective of meeting the power needs of the Fresno area and is the only project greater than 50 MW proposed for Fresno County. This area was identified by the CAISO as needing more local generation. Applicant engineers determined that there are two critical entry points to the Fresno area (Gregg and McCall substations) that have the capacity to carry at least 1,000 MW of local generation to meet demand in the Fresno local area. For maximum reliability, it is desirable to provide power to both substations. Alternative sites that were close to a substation through which power could be transmitted to either or both of these substations were considered. The Applicant had separately identified an available source of cooling water from the Fresno-Clovis WWTF; therefore, this was also a constant for each site. It was assumed that a parcel of sufficient size and orientation could be found within a mile of any of these alternative areas, although no specific parcels were identified in the alternatives analysis.

Alternatives were evaluated with respect to the following objectives of the Applicant:

- Construct and operate a merchant power plant that supplies economical, reliable, environmentally sound electrical energy and capacity to the Fresno power market.
- Proximity to at least one existing transmission substation with access to the Fresno Local Region electrical markets.
- Minimum feasible distance to reliable treated wastewater supply from the Fresno-Clovis Wastewater Treatment Facility.
- Minimum feasible distance to PG&E main gas pipeline.
- Consistency with existing land use.
- Minimum environmental impact.
- Sited away from existing residential and sensitive land uses.
- Maximum social and economic benefit to the community.

9.2.2 Alternative Sites

Five alternative sites were identified and evaluated for CVEC (Figure 9.2-1). A summary of the evaluation is provided in Table 9.2-1. A “plus” sign (+) in the table indicates that the alternative meets the objective. A “minus” sign (-) indicates the desired objective is not met.

TABLE 9.2-1
Site Selection Criteria

Alternative Site	Land Use Compatibility	Length of Water and Gas Lines	Access to Critical Substations	Environmental Impacts	Transmission Line Capacity	Community Benefit
Proposed	+	+	+	+	+	+
Kearney	+	-	+	-	-	+
Panoche	-	+	+	-	+	-
McCall	+	-	-	+	+	+
Helm South	-	+	+	-	+	-
Gregg	-	-	-	-	-	+

- + meets all objectives
- fails to meet one or more objectives

Land Use Compatibility refers to the consistency of the proposed project with zoned or existing uses. The proposed site is zoned for industrial use and is therefore consistent. The McCall and Kearney substation sites are primarily industrial and therefore uses would be consistent although rezoning from agricultural uses may be necessary. Panoche and Helm South are dominated by agricultural uses and therefore likely to be inconsistent and require rezoning. Gregg is adjacent to the San Joaquin River and may be within the area considered “parkway.”

Length of Water and Gas Lines refers to the length of construction, assuming connection to PG&E’s Line 2/Line 401 and the Fresno-Clovis WWTF. The proposed site Panoche, and Helm South all have approximately equivalent pipeline lengths. McCall, Gregg and Kearney would require 5 miles or more of additional pipeline construction, with resulting potential environmental and cost impacts.

Access to Critical Substations refers to the desirability of feeding power to both the McCall and Gregg critical entry points. Alternative sites located midway between the two (Proposed and Helm South) have this opportunity. McCall and Gregg, because of their proximity to one substation lack the reliability that comes with locating midway between the substations.

Environmental refers to a combined evaluation of environmental resource impacts. In general, Gregg is potentially sensitive to biological, cultural, visual and noise impacts, due to its proximity to the San Joaquin River and the parkway that borders it. Kearney and Panoche would cause potentially significant losses of agricultural lands that would not otherwise be developed, and may have more sensitive receptors for noise impacts. Helm South would have more adverse impacts because it is outside the City of San Joaquin, in an area that is not zoned for industrial development and is currently under Williamson Act protection. A more specific screening analysis of each resource area is provided in Table 9.2-2.

Transmission Line Capacity refers to the capability of existing transmission lines to carry an additional 1,000 MW from the proposed project without requiring substantial upgrades. There are numerous smaller substations in the County that are only rated for 70-kV to 160-kV, and therefore were not considered as viable alternatives. Within these alternatives, substantial upgrades are considered necessary for the Gregg and Kearney sites to manage the power from the proposed project.

Community Benefit refers to the political, social and economic benefits that would be realized by a municipality by development of the proposed project. It is the Applicant's experience that public and political support is very helpful in developing a successful project. The City of San Joaquin has been enthusiastic about its endorsement and assistance in this project. Alternative sites that are not in unincorporated Fresno County would not be expected to derive significant community benefits or support.

TABLE 9.2-2
Comparison of Environmental Effects of Alternative Project Sites

Resource	Proposed Site	Kearney	Panoche	McCall	Helm South	Gregg
Air Quality	Mitigated to less-than-significant	Would require approximately 5 miles or more pipeline construction.	Same as proposed	Would require approximately 15 miles more gas and water lines	Same as proposed	Would require approximately 20 miles of longer gas and water lines compared to proposed
Biological Resources	Mitigated to less-than-significant	Would require approximately 5 miles or more pipeline construction.	Potentially greater impact	Would require approximately 15 miles more gas and water lines	Same as proposed	Potential for substantial effect to riparian habitat along San Joaquin River
Cultural Resources	None	Would require approximately 5 miles or more pipeline construction.	Same as proposed	Would require approximately 15 miles more gas and water lines	Same as proposed	Potentially would require approximately 20 miles of longer gas and water lines compared to proposed
Land Use	Site is zoned for industrial use	May require rezone. Compatible with surrounding uses	May require rezone. Compatible with surrounding uses	May require rezone. Compatible with surrounding uses	May require rezone. Compatible with surrounding uses. Under Agricultural Preserve Williamson Act.	May require rezone. Compatible with surrounding uses
Noise	Project meets local LORS. Area is industrial, not likely to be sensitive	More residences near project site	No residences in project area	Same as proposed	Same as proposed	Site is potentially more sensitive
Public Health	Less-than-significant	Less-than-significant	Less-than-significant	Less-than-significant	Less-than-significant	Less-than-significant

TABLE 9.2-2
Comparison of Environmental Effects of Alternative Project Sites

Resource	Proposed Site	Kearney	Panoche	McCall	Helm South	Gregg
Worker Health and Safety	No significant impacts	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed
Socioeconomics	Significant benefit to local municipality	May benefit general City of Fresno area	No local municipality.	May benefit general City of Fresno area.	May benefit general Fresno County area	No benefit.
Agriculture and Soils	Site is zoned industrial	Would represent small loss of agricultural uses in County	Would represent small loss of agricultural uses in County	Would represent small loss of agricultural uses in County	Would represent small loss of agricultural uses in County	Potential loss of agricultural uses
Traffic and Transportation	No significant impact	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed
Visual Resources	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Potentially much greater than proposed
Hazardous Material Handling	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed
Waste Management	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed
Water Resources	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Potentially greater than proposed
Geologic Hazards	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed
Paleontological Resources	Mitigated to less than significant	Same as proposed	Same as proposed	Same as proposed	Same as proposed	Same as proposed

9.3 Alternative Linear Facilities

Linear facilities required for CVEC include an electric transmission line, a natural gas supply line, and water supply line (see Figures 1.1-1 and 1.1-2). The proposed linear facilities are presented in Section 2.0, Project Description; Section 5.0, Electric Transmission; Section 6.0, Natural Gas Supply; and Section 7.0, Water Supply.

9.3.1 Electric Transmission Lines

Due to the proximity of the proposed project site to PG&E's existing transmission lines, only one 1,500-foot electrical transmission line route was identified. No alternative routes were identified that had fewer environmental impacts. Therefore, no alternatives were analyzed.

9.3.2 Natural Gas Supply Lines

Several alternative natural gas supply routes were considered as described in Section 6.0. All alternatives followed existing roads and rights-of-way. Areas supporting potentially sensitive biological resources were identified near Kamm Avenue and Interstate 5, and in the vicinity of the Panoche metering station. The proposed gas supply route was selected specifically to avoid these potentially sensitive areas. No significant adverse impacts were identified along the proposed alignment; and therefore, only a screening analysis was completed on the two alternative routes identified.

9.3.3 Water Supply Lines

As discussed in Section 7.0, several alternative water supply routes were evaluated between the Fresno-Clovis WWTF and the project site (see Figure 7.1-4). Potential habitats for sensitive species were identified along McMullin grade during screening, and alternative alignments that avoided this area were developed and screened. The alternatives follow roads and rights-of-way, crossing through areas developed for agricultural uses. All alternatives cross under the same waterways and had similar potential for environmental impacts. No significant adverse impacts associated with the proposed alignment were identified; and therefore, no additional evaluation of alternatives beyond screening was performed.

9.3.3.1.4 Domestic Water Line and Sanitary Sewer Line

Domestic water for the project will be supplied by a 1.0 mile-long connection to the existing San Joaquin Municipal Water System. No significant adverse impacts were identified for the proposed alternative, and therefore no alternatives were further considered.

The proposed project would discharge sanitary waste to the City of San Joaquin municipal system with a 2.5-mile long line that connects to a lift station on Manning Avenue. No significant adverse impacts were identified for the proposed alternative, and therefore no alternatives were further considered.

9.4 Alternative Project Configurations

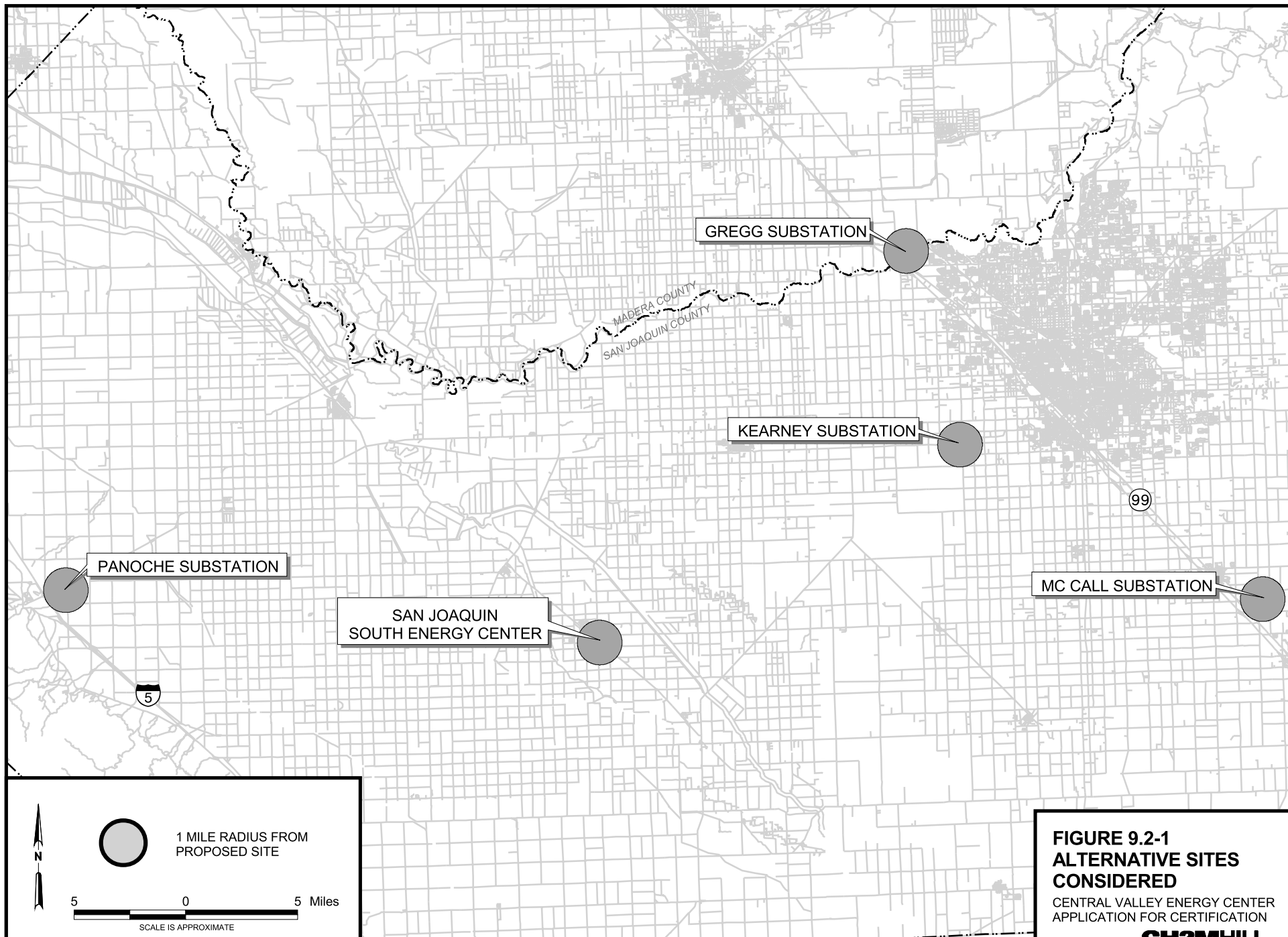
The proposed 1,060-MW configuration of CVEC is the result of considering a variety of design and operating considerations. The main factors affecting the configuration include available gas turbine-generator sizes, economies of scale for both construction and operation of the plant, fuel supply logistics, power transmission capacities and forecast market demand for electrical power. The proposed design configuration consists of the latest generation of commercially demonstrated combustion gas turbine technology.

Other configurations were investigated, including a smaller (500 MW) capacity plant and a design with two combustion turbines and two steam turbines. After thorough review of the engineering, operations, and market considerations, three combustion turbines with one steam turbine providing a 1,060-MW plant capacity configuration was selected as the optimal configuration for CVEC.

9.5 Alternative Technologies

Alternative technologies considered for CVEC were evaluated with respect to: 1) commercial availability, 2) implementability, and 3) cost-effectiveness.

- **Oil, Natural Gas, Coal Conventional, Supercritical Boiler/Steam Turbine or Simple Combustion.** This technology is commercially available, and could be implemented. However, because of its relatively low efficiency, it emits a greater quantity of air pollutants per kilowatt-hour-generated than technologies that are more efficient. The cost of generation is relatively high relative to combined cycle/natural gas fired technologies.
- **Nuclear.** California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high level radioactive waste has been demonstrated. To date, the CEC is unable to make the findings of disposal feasibility required by law for this alternative to be viable in California. The technology therefore is not implementable.
- **Hydroelectric.** Most of the sites for hydroelectric facilities have already been developed in California and any remaining potential sites face lengthy environmental licensing periods. It is doubtful that this technology could be implemented within 3 to 5 years, and the cost would probably be higher than the cost of a conventional combined cycle.
- **Geothermal.** Geothermal development is not viable at the CVEC project location. It was therefore eliminated from consideration.
- **Biomass.** Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing waste, and construction and urban wood wastes. Their cost tends to be high relative to a conventional combined cycle unit burning natural gas.
- **Solar.** Most of these technologies collect solar radiation, heat water to create steam, and use the steam to power a steam turbine/generator. Power is only available while the sun shines so the units do not supply power that can be cycled up or down to follow demand. The cost of solar power is relatively high when compared to the proposed technology.
- **Wind Generation.** In California, the average wind generation capacity factor has been 25 to 30 percent, and similar to solar cannot be cycled up and down to track demand. The cost of generation is generally above the cost of the proposed alternative.



**FIGURE 9.2-1
ALTERNATIVE SITES
CONSIDERED**
CENTRAL VALLEY ENERGY CENTER
APPLICATION FOR CERTIFICATION
CH2MHILL